Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

THAWING FROZEN SERVICE PIPES[1]

By A. W. Cuddeback

The communities supplied with water at retail by the companies affiliated with the East Jersey Water Company comprise Paterson, Passaic, Montclair and Clifton, with a total of 32,300 service pipe connections and a population of about 275,000.

There were reported last winter (1917–18) to the companies' offices 1000 frozen service pipes, which was about 3 per cent of the total number. In ordinary winters the companies have, of course, a few frozen service pipes, but not enough to warrant the maintaining of electrical apparatus to provide for their prompt thawing. Ordinary conditions were met by ordinary apparatus. The only equipment maintained for this work has been two or three coils of block tin tubing with force pumps for the purpose of thawing with hot water. This method is fairly effective and satisfactory when only a few cases occur each winter, and where the service pipes are installed with a straight connection to the main so that the tubing can be run from the meter location in the cellar directly through to the main. The freeze-ups during the past winter were reported so fast that they could not be handled with the available apparatus, and it was necessary to provide other more efficient and rapid means.

First a generating apparatus was built. This consisted of a low-voltage generator, which was especially wired at the local electric works, and an automobile engine mounted on a one and one-half ton Sampson truck as shown in figure 1. This apparatus cost, not including the motor truck, about $800. The generator was capable of delivering about 300 amperes at from 20 to 30 volts. The apparatus took six men to handle it, and was attended by a Ford run-about on which were mounted reels carrying the wire to make the necessary connections. An average of anywhere from eight to twelve services per day of eight hours was thawed, and the outfit was worked throughout the busy period with two eight-hour shifts in the twenty-four hours. The generating outfit was moved around

---

[1] Read before the annual convention at St. Louis, May 16, 1918.

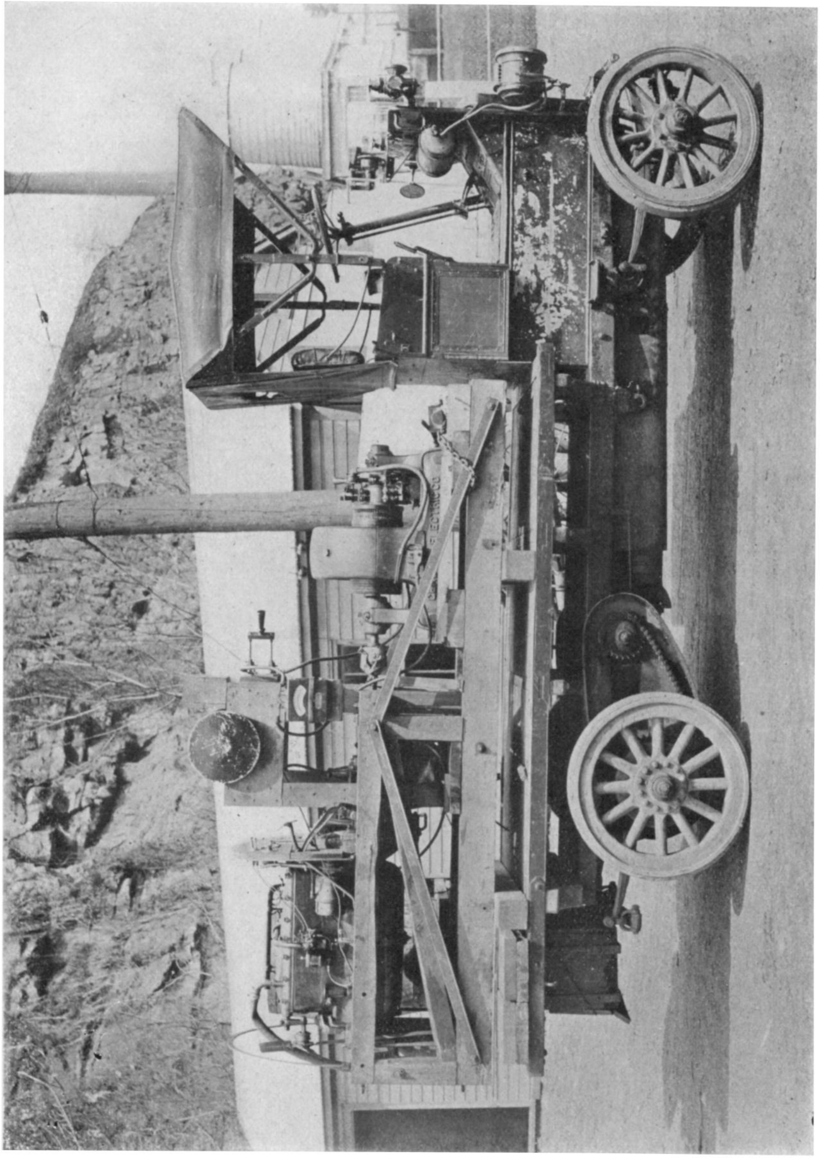

FIG. 1. GENERATING SET WITH GASOLINE ENGINE, FOR THAWING FROZEN SERVICE PIPES

to the different communities in which the companies operate, and thus lost considerable time but, generally speaking, was very satisfactory and efficient. It thawed 327 services at an average cost of $8.20 per service.

In addition to this thawing apparatus, one of the local electrical contractors rigged up a storage battery outfit on a Ford automobile. This apparatus was worked for seventeen days and thawed 115 services at a charge of $7.50 each.

The time taken to thaw ¾-inch services averaged perhaps thirty to forty minutes. Where services were very old and badly encrusted on the inside, it took from thirty minutes to one and one-half hours. Service pipes directly connected to the main without lead goose-necks could be thawed more quickly than where lead connections were used. The ordinary distribution mains are laid with 4 feet of covering, which perhaps gives a little more than 4 feet covering for the services.

Besides thawing electrically, about 150 service pipes were thawed by tubing and hot water. The average cost of those thawed in this way in Paterson was $11.34 per service; in Passaic $7.63 per service. This included the cost of digging to the main in the street in several instances.

The storage battery equipment consisted of sixty A5 cells, placed in six trays of 10 cells each, and hooked up as shown in figure 2.

Switches A, B, D, and E were three-pole double-throw unfused of 30 size. Switch F was four-pole double-throw unfused, of 60 amperes capacity. Switch C was two-pole double-throw 100-amperes, unfused. The ammeter, A′, and voltmeter, V, were connected as shown in the diagram.

In charging, switches A, B, D and E are thrown down to *c*, and main switch C is thrown to right to CH. This puts all cells in series. With a full battery on the first jobs, C is thrown to the left, to T, and switches A, B, D and E are thrown up to *d*, and the four-pole switch F is in a down position at *t′*. This connection puts the cells in multiple series (six trays in multiple of 10 series cells each) giving a voltage of about 15 with a large total current flow, but low current rate per unit tray.

When an extremely long service is reached or the battery voltage gets low, switch F is thrown up to position *t″*, making a series parallel connection of 20 cells series to a unit, and paralleling 3 units, thus adding voltage, but of course increasing the drain on each cell.

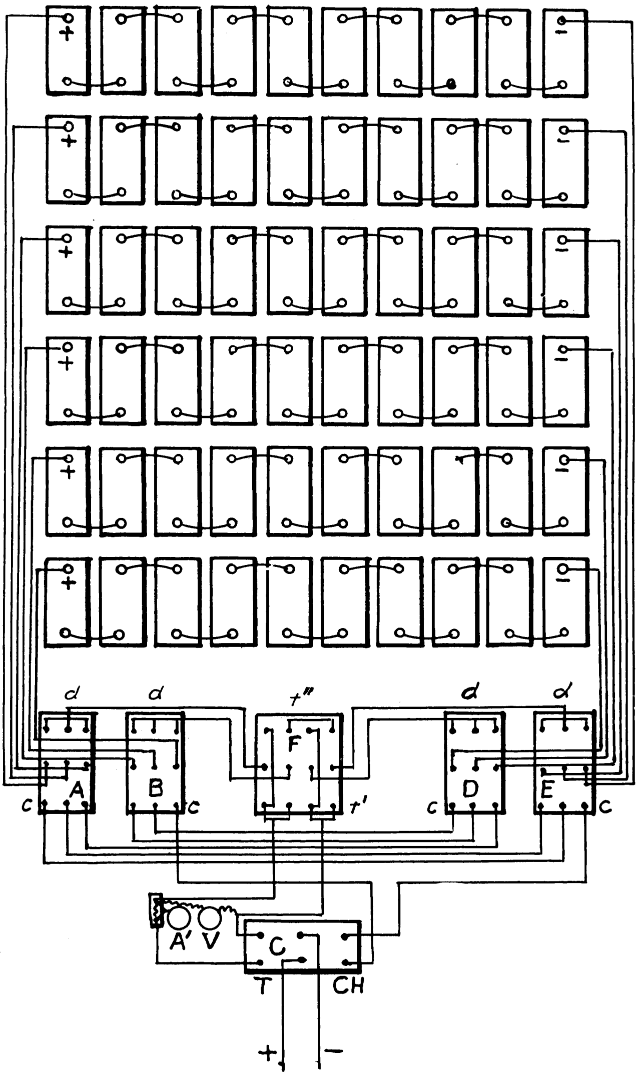

Fig. 2. Connections on Storage-Battery Thawing Outfit

In some cases it was necessary to use the whole 60 cells in series, getting a high voltage in order to break down some obstruction that was evidently in the way of giving a circuit. After obtaining a circuit it was possible to switch back to the first working order and proceed with the work.

Most of the frozen services were ¾-inch pipe and it was found that the battery could be thrown directly across the circuit, giving a total flow of about 250 to 325 amperes, the exact amount depending upon the length of the service. The usual custom was to hook on one lead ahead of the water meter, between it and the street, of the frozen service, and the other lead in a similar way to the service next door, or if none was at hand, the nearest hydrant. In a great many cases the services of two adjoining houses were frozen up, and then it was possible to thaw both simultaneously.

It was found that 1¼-inch pipe was too much for the equipment, but 1-inch was possible, although it took quite some time. The lengths varied from 60 feet up to 100 feet. These lengths nearly always included the main in the street, varying from 20 to 150 feet. With this equipment, it was not necessary to use a controlling rheostat, as the current was never too high, per cell, in fact very seldom rose over 50 amperes.

These cells were from an electric roadster purchased in 1914 and driven over 8000 miles, but they had been standing idle for the past two years. They were overhauled and put in service at thawing immediately.

It is hard to give the time required to thaw out a ¾-inch pipe, for this always depended on the degree of ice in the particular pipe. Some took only four minutes, others one and one-half hours, the latter for 1-inch pipe, but some ¾-inch services took as high as one hour. Heat was evident in all ¾-inch jobs in about three minutes. The total time after this for complete thawing depended on the condition of the interior of pipe.

A short length of 0000 cable was used, about 50 feet, and about 150 feet of No. 2 duplex, twisted together for leads, thus permitting the outfit to stand in front of the job to be done. The advantages of doing thawing work this way, with a battery equipment, especially for inside house work, are the cleanliness, quickness and entire absence of danger of fire, as compared with a generator equipment.